A 4k-Pixel CTIA Readout for Far IR Photodetector Arrays, Phase II

Completed Technology Project (2012 - 2014)

Project Introduction

We propose to design a low noise, two-side buttable, 64x64 readout multiplexer with the following key design features: 1- By far the largest readout array developed for far IR detectors to date. Four of these readout can be butted together to form a >16k-pixel mosaic array satisfying the need of the next generation of astronomical instruments. 2- Optimized for use with far infrared detectors requiring low bias levels. The unit-cell design will maintain constant bias across the detector during the integration eliminating non-linearity and detector debiasing. The design will also minimize pixel-to-pixel DC variations which improves the bias uniformity across all pixels of the array. 3- Capable of operation at cryogenic temperatures at least as low as 1.6K. Advanced monolithic cryo-CMOS technology will guarantee deep cryogenic operation with minimal impact on noise performance. 4- Offers the potential of being directly hybridized to IR detector arrays using planar bump-bond technology. This technology has been identified by NASA as well as the science and astronomy community as key for future far IR astronomy. It fits well within the scope of the SBIR Subtopic S1.04 and will be a benefit to many large and small NASA missions including SAFIR/CALISTO and SOFIA.

Primary U.S. Work Locations and Key Partners

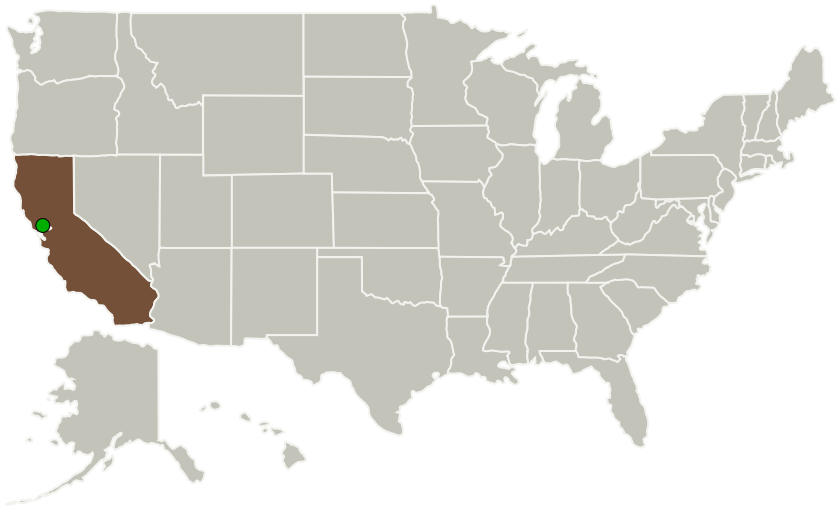

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

TechnoScience Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Continued on following page.

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Organizations Performing Work	Role	Type	Location
TechnoScience Corporation	Lead Organization	Industry	Palo Alto, California
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
California

Project Transitions

May 2012: Project Start

May 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137805)*

Images

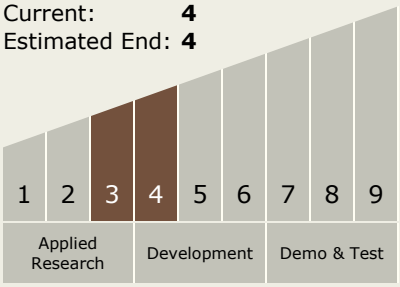
Project Image
A 4k-Pixel CTIA Readout for Far IR Photodetector Arrays
(https://techport.nasa.gov/image/126597)

Project Management *(cont.)*

Principal Investigator:
Jam Farhoomand

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System